

fully two inches long, and for the most part ashy grey throughout, a few only having short black tips. On the sides the hair is rufous brown, except at the base, where it is ashy, on the lower parts white with a slight rufous tinge throughout. On the neck the hairs are rufous brown, those on the back of the neck having ashy tips; on the breast they are paler rufous. Head brown, whitish round the eyes, whiskers partly black, partly white; inside surface of ears brown in front, whitish behind, the brown hairs having short black tips, no distinct dark band in front. Extreme tip of ears black, the colour only running a short distance down each margin. Ears inside clad, towards the tip and posterior margin, with buff hairs, a brown band near the hinder margin, which is buff. Tail white throughout. Limbs chiefly white, a brownish band running down the anterior portion of the fore legs.

The skull measures 3·63 inches long from the occipital plane to the front of the incisor teeth, and 1·73 broad across the widest portion of the zygomatic arches.

This hare appears to be found throughout a considerable tract in Western Tibet. The specimen in the Asiatic Society's collection was presented by Captain Smyth, but has no precise locality. This species is probably the *L. oiotolus* of Adams, P. Z. S., 1858, p. 520. I do not think it is the *L. oiotolus* of Hodgson, for a young specimen of *L. pallipes* agrees much better with Hodgson's description, and the ears in the former are said by Waterhouse\* to be coloured like those of *L. Tibetanus*. This is not the case in *L. hypsibius*.



XXII.—*On new or little-known species of Phasmidæ, with a brief preliminary Notice of the Occurrence of a Clasping Apparatus in the Males throughout the Family.*—By JAMES WOOD-MASON.

(Reed. Decr. 10th, 1875;—Read Jan. 5th, 1876.)

(With Plates XVI & XVII.)

#### LONCHODES WESTWOODII.

♀ *Bacillus Westwoodii*, Wood-Mason, J. A. S. B., Vol. XLII, 1873, p. 51, pl. V. figs. 1, 2; P. A. S. B., July, 1873, p. 149, and A. & M. N. H., 4th Ser., 1873, Vol. XII, p. 348.

♂. Body and limbs, especially the anterior pair, of excessive tenuity; the average width of the former not exceeding three-fourths of a line. Antennæ filiform, 22-jointed, all but as long as the five basal abdominal segments taken together. Head a complete miniature of that of the female,

\* Rodentia, p. 62.

being similarly armed with two minute spiniform tubercles. Meso- and metathorax dilated at the insertion of the legs. Abdomen exactly half the length of the body; terminal dorsal segment strongly carinate, its posterior and inferior angles produced into slender deflexed processes in contact at their tips only, which, like the sides of the resultant hiatus, are beset with minute spinules; terminal ventral segment pointed, carinate below for its posterior two-thirds. Legs simple except for the presence of minute representatives of the triangular spines seen near the apex of the femora in the opposite sex; their relative length 1, 3, 2.

Total length, 3 in. 4 lin.; head,  $1\frac{1}{2}$  lin.; proth.,  $1\frac{1}{4}$  lin.; mesoth., 9 lin.; metath.,  $7\frac{1}{2}$  lin.; abd.  $16\frac{1}{2} + 4 = 20\frac{1}{2}$  lin.; antennæ, 14 lin.; fore femora, 17, tibiæ,  $20\frac{1}{2}$ , tarsi, 6 =  $43\frac{1}{2}$  lin.; inter. femora, 11, tibiæ, 12, tarsi, 4 = 27 lin.; post. femora, 13, tibiæ, 16, tarsi,  $4\frac{1}{2} = 33\frac{1}{2}$  lin.

**HAB.** The above description is taken from a specimen preserved in alcohol captured on South Andaman by Mr. A. de Roepstorff.

**LONCHODES AUSTENI, n. sp.**

♂. In size, thickness, and armature like the *Acanthoderus Wallacei* of Westwood, but without the lateral spines and with a longer head and more prominent eyes; antennæ long and setaceous; head, pro- meso- and metanotum with a few minute granules, especially on the edges of the two last named; meso- and metathorax carinate above and below; the mesonotum, both divisions of the metanotum, and the abdominal segments armed with an erect spine at their extreme hinder ends, the abdominal spines gradually decreasing in size backwards so as to become almost imperceptible tubercles on the two penultimate segments; terminal ventral and dorsal abdominal segments much as in *L. luteoviridis*. Intermediate and posterior femora with two minute spines near the apex below; relative length of the legs 1, 3, 2, the posterior being very little shorter than the anterior pair.

Female unknown.

Total length,  $2\frac{1}{2}$  in.; head,  $1\frac{3}{4}$  lin.; proth.,  $1\frac{1}{2}$  lin.; mesoth.,  $7\frac{1}{2}$  lin.; metath.,  $4\frac{3}{4}$  lin.; abd.,  $12 + 3 = 15$  lin.; antenn.,  $20\frac{1}{2}$  lin.; fore fem. 10 lin., tibiæ, 12 lin.; interm. fem.  $7\frac{1}{2}$ , tibiæ, 8 lin.; post. fem. 9 lin.; tibiæ, 12 lin.

**HAB.**—Dikrang Valley, Assam; collected during the Dafla Expedition, by Major H. H. Godwin-Austen, after whom I have much pleasure in naming it.

**PHIBALOSOMA WESTWOODII, n. sp.**

♀ Very closely allied to *P. Cantori*, from which it differs in the great development of the lateral lobes of the 6th dorsal abdominal segment, and in the form of the head, the occipital region of which is broad, high, and convex, and surmounted by two rounded tubercles of very unequal size

that of the right side being by far the larger; minute scale-like rudiments of tegmina and wings.

Total length, 9 in.  $4\frac{1}{2}$  lin.; antennæ, 1 in.  $7\frac{1}{2}$  lin.; head, 7 lin.; prothorax,  $5\frac{1}{2}$  lin.; mesothorax, 1 in.  $9\frac{1}{2}$  lin.; metathorax, 1 in.  $3\frac{1}{2}$  lin. abdomen, 4 in. 1 lin. + 1 in.  $2\frac{1}{2}$  lin. = 5 in.  $3\frac{1}{2}$  lin.; breadth of 6th abd. segment at base,  $3\frac{1}{2}$  lin., of the same at apex,  $8\frac{1}{2}$  lin.

Male unknown.

HAB.—Nazeerah (Foster) and Samaguting (J. Butler), Assam.

I have much pleasure in naming this gigantic insect after my friend and former teacher Professor Westwood, Hope Professor of Zoology in the University of Oxford.

#### LOPAPHUS IOLAS, Westw.

♂ *Necroscia Iolas*, Westw., Monograph of Phasmidæ, p. 145, pl. xix, fig. 2.

♀. Much stouter than the male, about the same size and thickness, and relative proportions as *Bacteria Baucis*, but with the mesothorax narrowed in front; head, and pro- and mesonotum with scattered granules; legs armed as in the male; tegmina in the form of small closely appressed overlapping scales; not the faintest trace of wings; terminal dorsal abdominal segment and operculum much as in *Bacteria Baucis* and *Lonchodes Bootanicus*.

Total length, 4 in.  $6\frac{3}{4}$  lin.; head,  $2\frac{1}{2}$  lin.; proth.  $2\frac{3}{4}$  lin.; mesoth., 13 lin.; metath.,  $5\frac{1}{2}$  lin.; abd., 2 in.  $2\frac{5}{8}$  lin. + 5 = 2 in.  $7\frac{3}{4}$  lin.; antenn., 3 in. 5 lin.; tegmina, 2 lin.

The following are the admeasurements of a specimen of the male:

Total length, 3 in. 2 lin.; head,  $1\frac{1}{2}$  lin.; proth.,  $1\frac{3}{4}$  lin.; mesoth., 8 lin.; metath., 4 lin.; abd.,  $18\frac{1}{2}$  +  $3\frac{1}{2}$  = 22 lin.; antenn., 2 in. 9 lin.; tegmina,  $2\frac{3}{4}$  lin.; expanse of wings, 2 in. 11 lin., or reaching as far as to the apex of the 4th abdominal segment.

HAB.—Johore, in the Malay peninsula, and Sinkieb Island, off the N. E. coast of Sumatra, where the specimens were taken by my native collector. Professor Westwood's *Necroscia Iolas* was from Malacca.

Were it not for the presence of wings in the male and of rudimentary tegmina in the female, this species would have to be placed next to *Lonchodes porus*, Westw., the female of which will, I feel confident, prove to be either *Lonchodes Bootanicus* or *Bacteria Baucis*, or at any rate some closely similar form. It is placed, provisionally, in the genus *Lopaphus*, because the nearest winged ally of the female is indubitably the *Lopaphus brachypterus* of De Haan; but it might also have been ranged with the *Phibalosomas*, the females of some of which have minute scale-like rudiments of organs of flight, in the shape of mere adnate processes of the dorsal integument of the meso- and metathorax.

## PHYLLIUM SICCIFOLIUM.

Having never met with a specimen of this species in the numerous collections that have been submitted to my inspection since my arrival in this country, but having received one from Mauritius, I am forced to the conclusion that it is confined to Mauritius and some of the neighbouring islands, and that the specimens from Java, Timor, and New Guinea referred to it by De Haan have, as Westwood has suggested, been incorrectly determined. The latter author states that “in the Hopcian collection at Oxford there is one from the collection of Latreille with the locality “Seychelles” attached to it in his handwriting”: the locality now given thus corroborates that of the celebrated French entomologist.

## PHYLLIUM CELEBICUM, DeHaan, Pl. XVI.

Some time ago I received, through the kindness of the hon'ble Ashley Eden, to whom the Indian Museum has many times been indebted for valuable specimens, two examples—the one an adult female, the other a pupa of the same sex,—of a species which I have been unable to distinguish from the above, the adult specimen only appearing to differ from De Haan's typical one from the island of Celebes in the greater length of its tegmina and wings, but in the latter respect very nearly agreeing with a specimen from Manilla in the Hope Collection at Oxford.

The following are the admeasurements of Mr. Eden's adult specimen:—

Total length, 3 in. 3 lin.; head,  $3\frac{1}{2}$  lin.; proth.  $2\frac{3}{4}$  lin.; mesoth.,  $3\frac{1}{2}$  lin.; metath.,  $4\frac{1}{4}$  lin.; abd., 1 in. 7 lin. + 6 lin. = 2 in. 1 lin.; width of 3rd abd. segm. at middle, 1 in. 3 lin.; do. of 6th at base, 1 in.  $2\frac{1}{2}$  lin.; do. of same at apex and of 7th at base,  $8\frac{1}{2}$  lin.; length of wings 1 in.  $7\frac{1}{2}$  lin., or reaching to apex of 5th segm.; do. of tegmina, 2 in., or nearly to apex of 6th; width of do. 8 lin.; width of post. lobe of ant. fem.  $3\frac{3}{4}$  lin.; do. of ant. lobe,  $2\frac{1}{4}$  lin.

HAB.—Karen country, Burmah.

The fourth abdominal segment of the pupa is biocellated, as in the male, but not the faintest trace of these ocelli is detectible in the perfect insect.

## PHYLLIUM WESTWOODII, n. sp., Pl. XVII.

♀. Legs all similar to those of *P. siccifolium*; wings reaching as far as to a little beyond the second abdominal segment; the tegmina to the apex of the sixth; mesothorax granulated above and below and at the sides; abdomen gradually widening from the base to the angulation which occurs a little beyond the middle of its third segment; from this point narrowing, at first very gradually, at last somewhat more rapidly to the apex of the 6th so that its sides are slightly and regularly arcuate; its three terminal segments forming together a triangular mass, the sides of the seventh

slightly concave ; the operculum reaching almost to the apex of the basal third of the terminal dorsal segment.

♂. Legs all exactly as in the female ; the antennæ, which are tomentose, as long as the wings, and composed of 26 very distinct joints, all produced into a point below at apex, when laid back reach quite as far as to the apex of the 4th abdominal segment ; the tegmina extend to the middle of the 2nd, the wings to the apex of the 7th abdominal segment. Abdomen, at first very slightly and gradually, then more suddenly widening to a little beyond the middle of the 3rd segment ; thence maintaining the same width to apex of 4th, whence at first very gradually and afterwards more suddenly narrowing to its extremity, the sides being slightly arcuate ; a faintly marked pair of ocelli on the posterior half of 4th segment ; the three terminal ventral segments carinate below, the last of them broadly rounded at the tip and barely reaching the level of the end of the basal third of the terminal dorsal one.

♀. Total length, 4 in. ; head, 4 lin. ; proth.,  $3\frac{1}{4}$  lin. ; mesoth.,  $5\frac{1}{4}$  lin. : metath., 6 lin. ; abdom., 2 in. +  $7\frac{1}{2}$  lin. = 2 in.  $7\frac{1}{2}$  lin. ; breadth of 3rd segm. abdom. at angulation 20 lin. ; do. of 6th at base, 1 in. 4 lin. ; do. of 6th at apex,  $10\frac{1}{2}$  lin. ; width of post. lobe of ant. fem. 3 lin. ; do. of ant. lobe,  $2\frac{1}{4}$  lin. ; length of tegmina, 2 in. 7 lin., width of do. 10 lin. ; length of wings, 1 in. 2 lin.

♂. Total length, 2 in. 9 lin. ; head, 2 lin. ; proth.,  $1\frac{3}{4}$  lin. ; mesoth. (measured below),  $3\frac{1}{4}$  lin. ; metath. (measured below),  $4\frac{1}{2}$  lin. ; abd., 1 in.  $5\frac{1}{2}$  lin. +  $4\frac{3}{4}$  lin. = 1 in.  $10\frac{1}{4}$  lin. ; breadth of do. at base 4 lin. ; of 3rd segt. at angulation,  $8\frac{1}{2}$  lin. ; of 5th at apex  $7\frac{1}{2}$  lin. ; of 6th at apex 5 lin. ; length of tegmina,  $10\frac{1}{2}$  lin. ; of wings, 2 in. ; of antennæ, 2 in.

All the above measurements are taken from alcoholic specimens.

**HAB.**—The female from South Andaman, where it was captured by Captain Protheroe on his dining table, so that the females of this species must possess some considerable powers of flight. The insect which I confidently believe to be the male of this species was taken by Mr. W. Davison, near Pahpoon, about 150 miles north of Moulmein, in the Salween country. The acquisition of a male from Port Blair or of a female from Burmah will alone decide whether these two insects have been legitimately paired or not.

The female differs from that of *P. siccifolium* in having tolerably well-developed wings instead of minute scale-like rudiments of such, in the shape of the abdomen, in which three instead of two segments go to form the triangular termination, and by its less strongly serrated mesothorax ; and from that of *P. Celebicum* in the form of the external lobes of the fore femora, which are semioval instead of angulated, and notably in the form of the abdomen ; in which latter point the male differs most conspicuously from that of the same species.

I take this opportunity of stating that the terminal dorsal abdominal segment in the males of all the species belonging to this family of Orthopterous insects with the exception of those of the genus *Phyllium* is modified to serve as a more or less efficient clasping apparatus. In its simplest form, this consists of a number of very minute highly indurated dark brown spinules developed upon the under surface of the segment near its hinder margin (*Bacillus hispidulus*, W-M., etc.); very frequently, however, the whole segment is so profoundly modified as to constitute a regular forceps (most species of *Lonchodes*, *Phibalosoma hypharpax*, *Podacanthus Typhon*, etc.), the arms of which are in contact throughout their length and beset internally with interlocking teeth, or in contact and spined at their extremities only; these extremes of simplicity and specialization being connected by every conceivable gradation. In correlation, the anal cerci, which are invariably straight in the females, are curved and decussated. But neither has this condition of the anal cerci been hitherto recognized as appertaining exclusively to the male sex, nor have the structures to which a prehensile and retentive function is now for the first time assigned been interpreted, although both have been figured and described in numerous species by Professor Westwood and others.

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